

Date: Friday, 07/03/2008 11:05:37 AM
 User: Jean-Luc Menard

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: 212/205 HIGH AFT X-TUBE ASSEMBLY
Job Number	: 37694	Part Number	: D212664201 <i>TRN</i>
Estimate Number	: 10257	Drawing Number	: D212-664-241 REV C
P.O. Number	:	Project Number	: N/A
This Issue	: 07/03/2008 S.O. No. :	Drawing Revision	: C
Prsht Rev.	: NC	Material	:
First Issue	: / / Type : LANDING GEAR	Due Date	: 14/03/2008 Qty: 1 Um: Each
Previous Run	: 37693		
Written By	: <i>JLM 08.03.07</i>		
Checked & Approved By	:		
Comment	: Est Rev:E 04.02.16 Reformat K/DS Est Rev:F 06-03-29 Remove Coments on Pick List JLM Est Rev:G 07-04-30 As per Rev C JLM		

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D212-664-201CHG003

2.0

D6006129

Crosstube material



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6006-129 Crosstube *B34690*

Check OD = 3.250"; ID = 2.220"

a.m 08.03.13 ①

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA114

2-Turn first side as per Folio FA114

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241.

J.F. 08/03/14 ①

4.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

J.F. 08/03/14 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: 0212-664-201 PAR #: N/A Fault Category: Prod / Machine part NCR: Yes No DQA: 1 Date: 2019/02
 QA: N/C Closed: 1 Date: 2019/02

NCR: <u>37694</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08/03/19	3.0	The length of the tube is about .040" over tolerance. Material expands and flares at both ends after machining	<u>[Signature]</u> 08/03/19	Tube acceptable. Ensure the position of the tube origins are correctly positioned.	J.F. 08/03/19	<u>[Signature]</u> 08/03/20	<u>[Signature]</u> 08/03/19	<u>[Signature]</u> 08/03/19
		* on the total length x						

NOTE: Date & initial all entries

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Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA114

2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241.

J-F. 08/03/14 ①

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

J-F. 08/03/14 ①

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

08/03/14 ①

8.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Remove sand and plugs

2-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-241

J-F. 08/03/14 ①

9.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

AUM 8-3-31

1-Polish entire outside surface of crosstube

10.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

08/03/14 ①

11.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of machining

AUM 8-3-31

JD + STK

DP 8-4-2

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Job Number: 37694

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP 8-4-2

13.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D212-664-241 using CNC bender program 212-af and Folio FT007

14.0

QC15

DIMENSIONAL CHECK OF X-TUBES



Comment: DIMENSIONAL CHECK OF X-TUBES

N/A stock as turned only

15.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D212-664-241 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-241

16.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of bending and drilling

17.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

18.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

19.0

OUTSIDE SERV.10

OUTSIDE SERVICES LG



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: _____

LPI as per ASTM 1417 Level 2

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

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Job Number: 37694

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

Attach copy of NDT results to work order

20.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

21.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: DIMENSIONAL CHECK

Inspect for damage & ensure results are as per Dwg D212-664-241

22.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

23.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

24.0

D29401

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2940-1 Support

25.0

D3595

Rubber Cushion (per sq ft)



Comment: Qty.: 0.0242 sf(s)/Unit Total : 0.0242 sf(s)

Rubber Cushion (per sq ft)

.63" x 5.300

Batch:

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

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Job Number: 37694

Part Number: D212664201

Job Number:



Seq. #:	Machine Or Operation:	Description :
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26.0	MS2192028	Clamp(per MIL-DTL-8783C)
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Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp _____

27.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1
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Comment: LANDING GEAR RESOURCE 1

1-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond Batch: _____

Expiry Date: _____

2-Install clamps as per Dwg D212-664-241. Torque clamps to 80-100 in lb.

28.0	QC5	INSPECT WORK TO CURRENT STEP
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Comment: INSPECT WORK TO CURRENT STEP

N/A

W

29.0	PACKAGING 1	PACKAGING RESOURCE #1
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Comment: PACKAGING RESOURCE #1

Pick Packing Kit

30.0	D34281	Placard
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Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Placard

Batch: _____

31.0	AN640A	Bolt
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Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: _____

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

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Job Number: 37694

Part Number: D212664201

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

AN641A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)
Bolt
Batch: _____

33.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)
Washer
Batch: _____

34.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)
Nut
Batch: _____

35.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

36.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1
Identify and pack for shipping as per PPP D212-664201

37.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



new KAN BAN system D08/04/02

u 08-04-02

DART AEROSPACE LTD	Work Order: 376964
Description: Crosstube Assembly (205/212 High Aft)	Part Number: D212-664-241
Inspection Dwg: D212-664-241 Rev: C	Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ **First Article**
☐ **Prototype**

Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	0.200"	✓			
	R0.063	+/-0.010	R0.063"	✓			
	2.990	+0.005/-0.000	2.994"	✓			
	5.237	+/-0.030	5.257"	✓			
	2.600	+0.005/-0.000	2.605"	✓			
	2.686	+0.005/-0.000	2.691"	✓			
	2.770	+0.005/-0.000	2.775"	✓			
	2.854	+0.005/-0.000	2.858"	✓			
	2.938	+0.005/-0.000	2.941"	✓			
	3.021	+0.005/-0.000	3.026"	✓			
	3.133	+0.005/-0.000	3.137"	✓			
	3.179	+0.005/-0.000	3.182"	✓			
SIDE B	0.200	+/-0.010	0.200"	✓			
	R0.063	+/-0.010	R0.063"	✓			
	2.990	+0.005/-0.000	2.994"	✓			
	5.237	+/-0.030	5.243"	✓			
	2.600	+0.005/-0.000	2.605"	✓			
	2.686	+0.005/-0.000	2.691"	✓			
	2.770	+0.005/-0.000	2.775"	✓			
	2.854	+0.005/-0.000	2.859"	✓			
	2.938	+0.005/-0.000	2.941"	✓			
	3.021	+0.005/-0.000	3.026"	✓			
	3.133	+0.005/-0.000	3.133"	✓			
	3.179	+0.005/-0.000	3.182"	✓			
	124.36	+/-0.020	124.380"	✓			

Measured by: J.F.	Audited by: [Signature]	Prototype Approval:	N/A
Date: 08/03/14	Date: 08/03/14	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-201)	KJ/JLM	
B	06.03.09	Tolerance for 5.237 was +/-0.001	KJ/JLM	
C	07.05.08	Dwg Rev. updated	KJ/JLM	[Signature]



DESIGN <i>PH</i>	DRAWN BY <i>PH</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>J</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D212-664-241	REV. C SHEET 1 OF 3
DATE 07.03.08		TITLE CROSSTUBE ASS'Y (205/212 HI AFT) NTS	
A	00.12.12	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	07.03.08	REMOVE -1009 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	

RELEASED
07.04.24 *PH*
PER E.C.N 2059

Qty	Part Number	Description
X	D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
1	D6006-129	CROSSTUBE
2	D2940-1	SUPPORT
4	D3595-063-530	RUBBER CUSHION
4	MS21920-28	CLAMP (OR MS21920-30)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

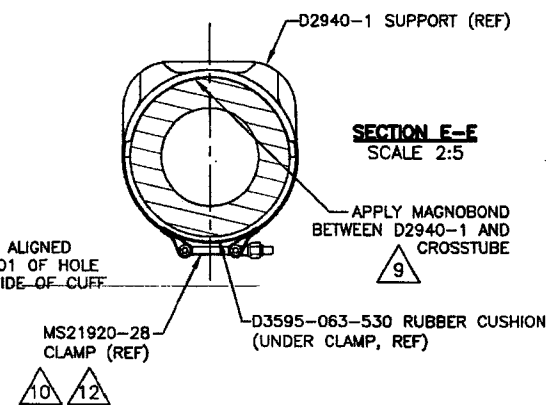
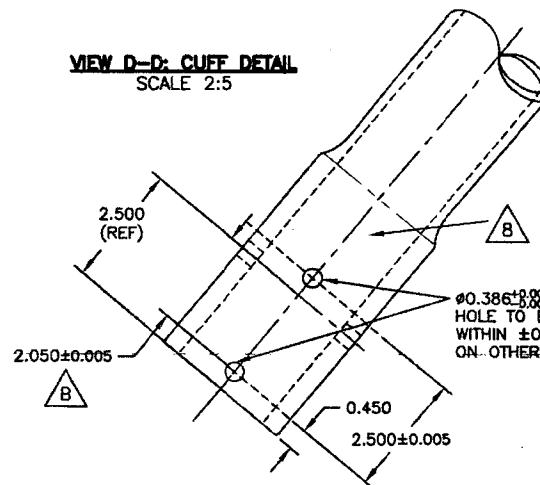
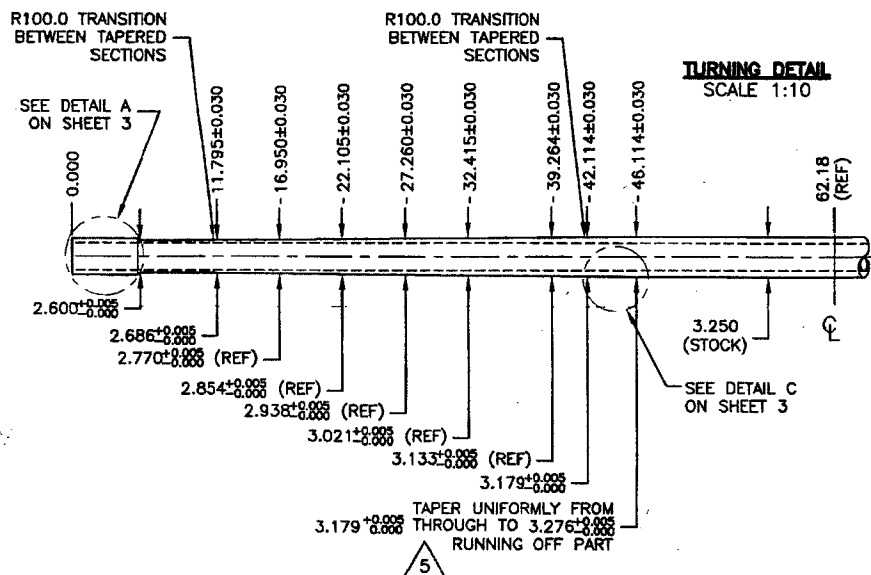
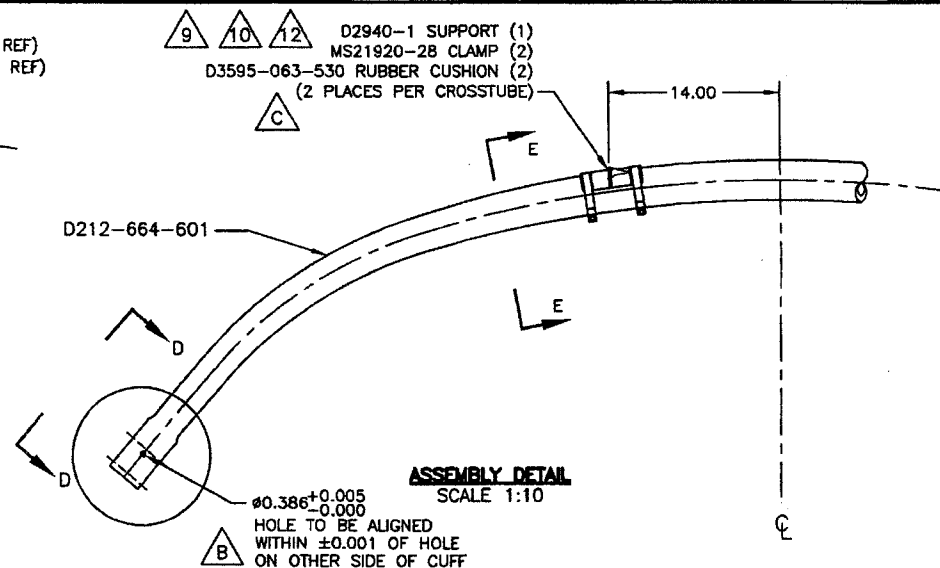
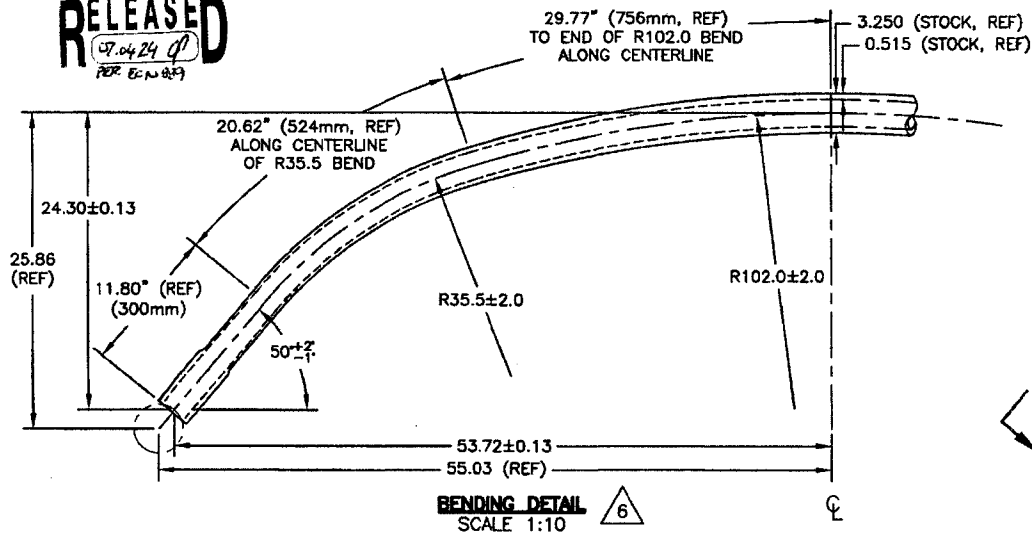
GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) MATERIAL: MANUFACTURED FROM D6006-129
FINISHED LENGTH = 124.36±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2940-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 10) INSTALL MS21920-28 CLAMPS WITH D3595-063-530 RUBBER CUSHIONS TO SECURE D2940-1 SUPPORT ON TOP SIDE OF CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT
NOTE: MS21920-30 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS. ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

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RELEASED
 07.04.24
 PER E-20-029



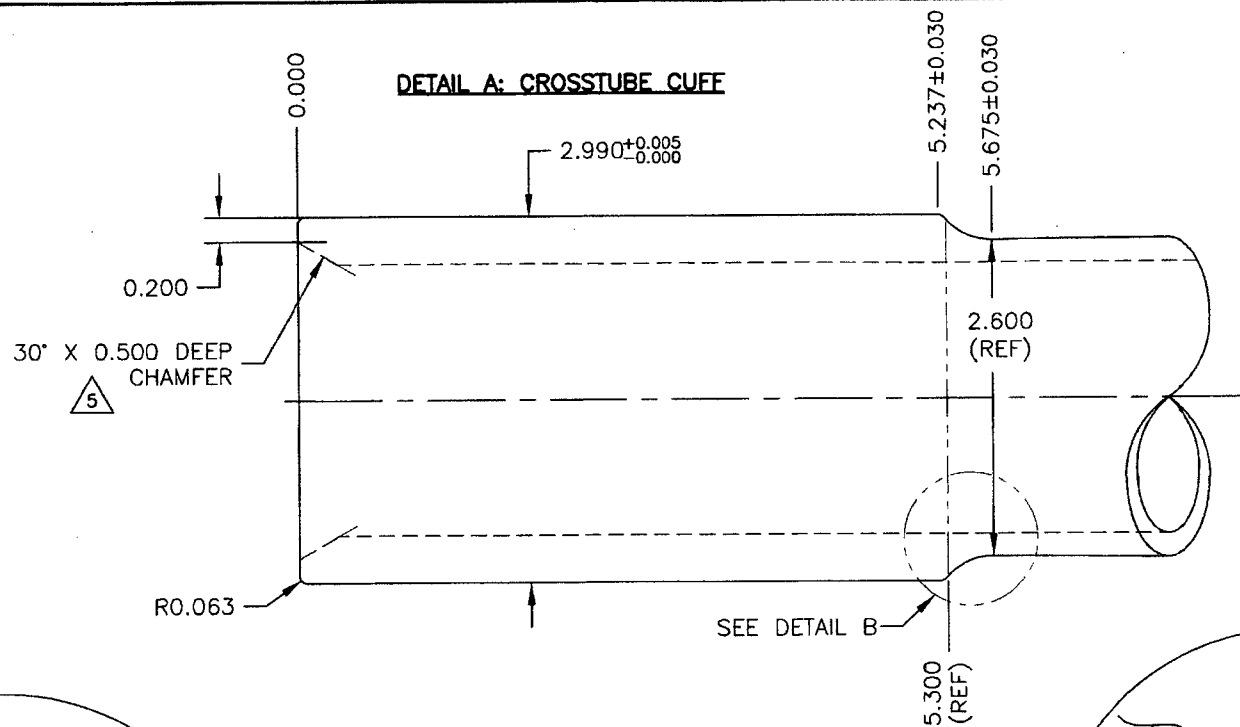
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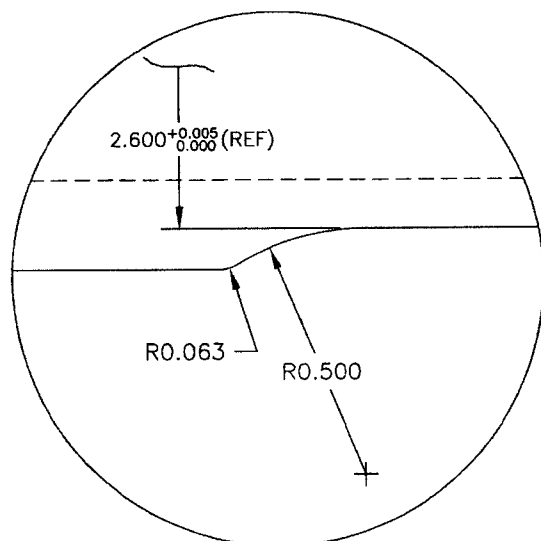
DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. WINDERSLEY, ONTARIO, CANADA
CHECKED J	APPROVED A	DRAWING NO. D212-664-241	REV. C SHEET 2 OF 3
DATE 07.03.08	TITLE CROSSTUBE ASS'Y (205/212 HI AFT)	SCALE 1:10	

RELEASED
70424 P
PER ECN 885

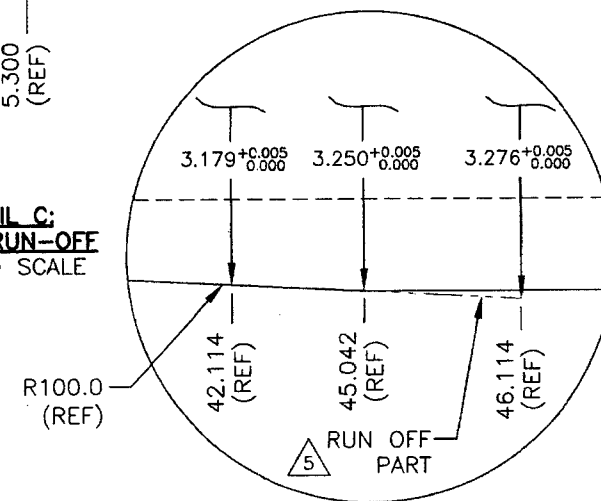
DETAIL A: CROSSTUBE CUFF



**DETAIL B: CUFF
TRANSITION
SCALE 4:1**



**DETAIL C:
TAPER RUN-OFF
NOT TO SCALE**



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DATE 07.03.08	

DART DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D212-664-241	REV. C SHEET 3 OF 3
TITLE CROSSTUBE ASS'Y (205/212 HI AFT)	SCALE 1:1